



The Case of the “Mystery Resistor” _____

Purpose: In this activity, you will investigate the relationship between the electric current and the potential difference flowing through a mystery resistor and a load. By understanding this relationship, you will be able to solve the value of the resistor.

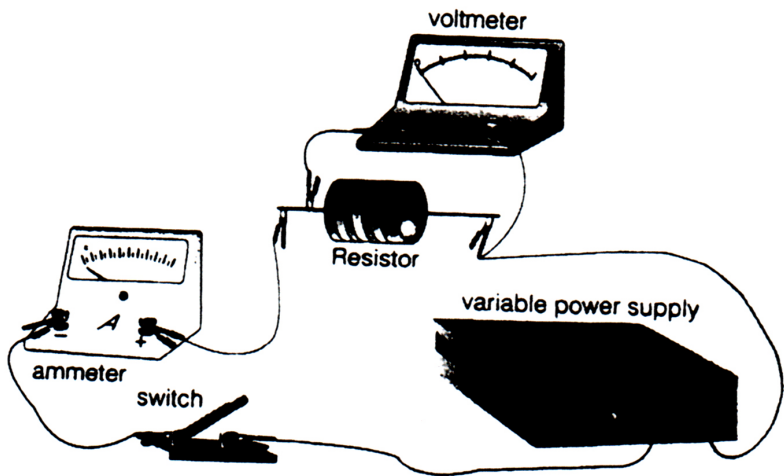
Hypothesis: As the electric current increases, we would expect the potential difference to _____, because _____

Materials:

- (6) Batteries
- (6) Connecting Wires
- Resistor
- Switchboard
- Ammeter
- Voltmeter
- Bulb

Method:

1. Connect the circuit shown here.



2. Adjust the power supply to give the values shown in the following table. Record the potential differences and ammeter readings in the table.

Setting on Power Supply (V)	Potential Difference (V)	Electrical Current (A)
0		
3.0		
6.0		
9.0		

3. Open the switch. Replace the resistor with the bulb. Repeat step 2.

Setting on Power Supply (V)	Potential Difference (V)	Electrical Current (A)
0		
3.0		
6.0		
9.0		

Observation:

1. Draw a circuit diagram for this circuit.
2. Plot all of the values on ONE graph that shows the potential difference against current for the resistor and the bulb. Plot current (A) on the x-axis and the potential difference (V) on the y-axis. Use a different colour or plotting symbol for each set of data and draw the line of best fit.
3. Calculate the slope resistor. Show all your calculations and units.
4. For the bulb, calculate the resistances for each data point using Ohm's Law.

Discussion:

1. What is the resistance of the resistor?
2. Describe the relationship between voltage and current for the resistor.
3. How does this relationship differ for the lightbulb? Is a lightbulb an ohmic resistor? Explain your answer.
4. What can you infer about the resistance of the lightbulb as the current through it increases?

Conclusion:

In a short paragraph, summarize three important scientific concepts demonstrated in this lab.



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You have been hired to find the value of your mystery resistor. Fortunately, you are provided with three clues and a set of tools to investigate the case. The clues are as follows:

- Clue #1: Potential difference = Electric current x Electrical resistance ($V = I \times R$)
- Clue #2: Slope = $\frac{\text{Rise}}{\text{Run}} = \frac{y_2 - y_1}{x_2 - x_1}$
- Clue #3: Change the power supply to get different values for potential difference and electrical current.

Tools:

(6) Batteries	Ammeter
Switchboard	Voltmeter
Mystery Resistor	
(5) Wires	

Task #1: Your task is to design a circuit that allows you to find the value of the mystery resistor. Ensure that you include all work (tables, calculations, graphs, units).

Task #2: You have been given a new tool, a lightbulb. Your second task is to design a circuit that allows you to investigate resistance in the lightbulb. Ensure that you include all work (tables, calculations, graphs, units) and answer the following questions in your report.

Discussion:

1. What is the resistance of the resistor?
2. Describe the relationship between voltage and current for the resistor.
3. How does this relationship differ for the lightbulb? Is a lightbulb an ohmic resistor? Explain your answer.
4. What can you infer about the resistance of the lightbulb as the current through it increases?

Conclusion:

In a short paragraph, summarize three important scientific concepts demonstrated in this lab.

Wet Lab – Evaluation Sheet

The Case of the “Mystery Resistor” Evaluation

Name: _____

Communication	Thinking/Inquiry
Title Page [0 1 2] Student formulated a descriptive title. All the relevant information (name, date, course) is included.	
Background Information [0 1 2 3 4] Student demonstrates an understanding of voltage, current, and resistance. The purpose of resistance in real-life is explained. Proper grammar and spelling is present.	
	Purpose [0 1 2] Student correctly expresses the purpose of this lab.
	Materials [0 1] Student provides a complete list of materials.
	Procedure [0 1 2] Student includes all the steps performed in the lab.
Observations Circuit Diagram [0 1 2] Tables (complete, correct) [0 1 2 3] Graphs [0 1 2 3 4 5 6] <ul style="list-style-type: none"> - Graph paper used - Axis labels and units - Descriptive title - Lines of best fit Calculations [0 1 2]	
	Questions #1 [0 1] #2 [0 1 2] #3 [0 1 2 3] #4 [0 1]
	Conclusion [0 1 2 3] Complete, as instructed
Total /19	Total /15